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PATENT

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4-21-05

Date:



Himanshu S. Amin

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re patent application of:

Applicant(s): Frederick M. Discenzo

Examiner: Hwa S. Lee

Serial No: 09/625,094

Art Unit: 2877

Filing Date: July 25, 2000

Title: SYSTEM FOR MONITORING BEARING WEAR

Mail Stop Appeal Brief-Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

REPLY BRIEF

Dear Sir:

Applicant's representative submits this Reply Brief in response to the Examiner's Answer dated February 23, 2005. A Request for Oral Hearing and a credit card payment form are filed concurrently herewith, wherein the credit card payment form is believed to cover all fees due regarding this document and the Request for Oral Hearing. In the event any additional fees may be due and/or are not covered by the credit card, the Commissioner is authorized to charge such fees to Deposit Account No. 50-1063[ALBRP178US].

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REMARKS

Claims 1-21, 24-27, and 37-43 are currently pending and are presently under consideration. Favorable reconsideration of the subject patent application is respectfully requested in view of the comments herein. In particular, the following comments address deficiencies contended in the Examiner's Answer to applicant's Appeal Brief.

I. Regarding the Rejection of Claims 1-12, 14-21, and 24-27 under 35 U.S.C. §103(a)

The Examiner incorrectly maintains the rejection of claims 1-12, 14-21, and 24-27 under 35 U.S.C. §103(a) as being unpatentable over Dunphy, *et al.* (US 5,399,854) in view of Kersey, *et al.* (US 5,361,130) and Thomas, *et al.* (US 4,460,893). It is respectfully submitted that the assertions brought forth in the Final Office Action and the Examiner's Answer are incorrect in view of at least the reasons set forth below as well as in applicants' Appeal Brief. The subject invention as recited in independent claims 1, 16, and 24 relates to systems and/or methods for determining at least one condition of a bearing by way of embedding an optical fiber therein. In particular, claim 1 recites *a system for determining at least one condition of a bearing, comprising at least one optical fiber embedded in a bearing*. Independent claims 16 and 24 recite similar limitations.

Dunphy, *et al.*, in contrast to the claimed invention, discloses embedding an optical fiber within a plurality of layers of material, wherein each of the plurality of layers of material includes reinforcing filaments that are arranged in a predetermined manner and bonding material that is utilized to hold together a composite structure that is created from the plurality of layers of material. Thus, it is clear that the claimed invention recites *providing a bearing having an optical fiber embedded therein*, while Dunphy, *et al.* teaches embedding an optical fiber within a plurality of layers of material. Further, as stated in previous correspondence and re-emphasized herein, the optical sensor of Dunphy, *et al.* is complex, and does not lend itself to being embedded within a bearing as claimed. Thus, Dunphy, *et al.* does not provide any suggestion of *providing a bearing having an optical fiber embedded therein*, as there is no mention of a bearing or other similar device within such reference.

Thomas, *et al.* discloses a system for detecting metal-to-metal contact in a journal bearing by placing a thermocouple "in close proximity to the maximum load-bearing point" in order to monitor temperature of the bearing (See col. 3, lines 32-44). Like Dunphy, *et al.*, Thomas, *et al.*

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provides no teaching, suggestion, or motivation to *embed an optical fiber in a bearing* as recited in the subject claims. In the Examiner's Answer dated February 23, 2005, the Examiner has cited Lee, *et al.* to provide motivation to utilize the optical sensor of Dunphy, *et al.* and embed such sensor within the bearing of Thomas, *et al.* With more specificity, the Examiner has cited a passage that indicates that interferometric systems are more able to measure high temperatures with more accuracy when compared to thermocouples. (See col. 2, lines 24-35). The Examiner, however, has failed to bring forward a passage within the same reference that relate to problems associated with interferometric systems. For convenience, such passage is provided below.

Implementation of such conventional interferometric temperature sensing methods is not easy. Such methods are plagued by many difficult problems. Also, since expensive optical elements such as a single-mode fiber directional coupler is required for implementation, practical use of such devices and methods is limited. (See col. 2, lines 23-29).

Thus, in certain instances and applications, interferometric systems may be beneficial and/or a feasible alternative over thermocouple devices – however, the Examiner has failed to provide any teaching, suggestion, or motivation *within the cited references to providing a bearing having an optical fiber embedded therein* as is recited within the subject claims. See *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991) (emphasis added), which holds that a teaching or suggestion to make the claimed combination *must both be found in the prior art and not based on applicant's disclosure*. Moreover, if it is deemed that Lee, *et al.* provides requisite motivation to combine Dunphy, *et al.* and Thomas, *et al.*, none of the cited references provides an adequate expectation of success in combining Dunphy, *et al.* and Thomas, *et al.* In more detail, the above reproduced passage of Lee, *et al.* admits that implementation of interferometric devices is extremely difficult and practical use thereof is limited. Lee, *et al.* later states that the interferometric device can be employed in situations where calculation of extremely high temperatures is required, such as nuclear reactors, jet engines, and transformers, but nowhere indicates that an *optical fiber* can be *embedded within a bearing* as claimed. See *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991) (emphasis added), which holds that a reasonable expectation of success to make the claimed combination *must both be found in the prior art and not based on applicant's disclosure*.

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Given that the cited references lack requisite motivation to combine such references and further lack a reasonable expectation of success of making the claimed invention, applicant's representative asserts that the Examiner is utilizing hindsight to pick and choose elements that existed in the prior art by employing applicant's specification as a blueprint. The Federal Circuit has consistently held that

... 'virtually all [inventions] are combinations of old elements.' Therefore an examiner may often find every element of a claimed invention in the prior art. *If identification of each claimed element in the prior art were sufficient to negate patentability, very few patents would ever issue.* Furthermore, rejecting patents solely by finding prior art corollaries for the claimed elements would permit an examiner to use the claimed invention itself as a blueprint for piecing together elements in the prior art to defeat the patentability of the claimed invention. *Such an approach would be 'an illogical and inappropriate process by which to determine patentability.'* In re Rouffet, 149 F.3d 1350, 1357, 47 U.S.P.Q.2d 1453 (Fed. Cir. 1998) (citations omitted).

The Examiner has identified a optical sensor in Dunphy, *et al.* and a bearing with a thermocouple therein in Thomas, *et al.*, and rejected the subject claims based at least in part thereon by stating that generally interferometric systems can be more accurate and measure higher temperature ranges (for example, in nuclear reactors as described in Lee, *et al.*) when compared to thermocouples. Given problems associated with implementation of interferometric systems cited in Lee, *et al.*, however, it is asserted that the Examiner has failed to meet his burden of providing motivation to combine the references to *embed an optical fiber in a bearing* as claimed.

With regard to claim 16, it is submitted that Dunphy, *et al.*, Thomas, *et al.*, and Kersey, *et al.*, fail to teach or suggest *at least one optical fiber at least part of which is embedded in a bearing, the at least one optical fiber having first and second ends, the first end receiving the beam of light, the second end being flush with a contacting surface of the bearing* as claimed. In more detail, none of the aforementioned references discloses placing any sort of sensing mechanism flush with a contacting surface of a bearing as claimed. The Examiner asserts that because Thomas, *et al.*, displays a thermocouple in proximity to a contact surface of a bearing, it

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would be obvious to one of ordinary skill in the art to place an optical fiber flush with a contacting surface of a bearing. Again, however, it appears that the Examiner is utilizing applicant's specification and claims as a roadmap in an attempt to make obvious the claimed invention. In particular, the cited figure in Thomas, *et al.* illustrates that a thermocouple is in a bearing in such a manner that a significant amount of space exists between a contact surface of the bearing and the thermocouple. There is no mention within Thomas, *et al.* of altering position of the thermocouple to place it in closer proximity to a contact of the surface of a bearing – much less positioning an *optical fiber flush with a contact surface of a bearing* as is recited in independent claim 16. Again, there must be some teaching or suggestion *within the cited references* to reject claims under 35 U.S.C. §103; the Examiner has failed to meet this burden.

In view of at least the above, it is readily apparent that the rejection of claims 1, 16, and 24 (and claims 2-12, 15-21, and 25-27, which depend there from) should be reversed.

II. Regarding the Rejection of Claims 13, 27, and 37-43 under 35 U.S.C. §103(a)

The Examiner incorrectly maintains the rejection of claims 13, 27, and 37-43 under 35 U.S.C. §103(a) as being unpatentable over Dunphy, *et al.* in view of Kersey, *et al.* and Thomas, *et al.* and further in view of Ide (US 5,382,097). Reversal of this rejection is respectfully requested for at least the following reasons. Claims 13 and 27 depend upon independent claims 1 and 24, which are believed to be in condition for allowance. Accordingly, the rejection of such claims is believed to be moot. Independent claim 37, like independent claims 1, 16, and 24, includes an *optical fiber embedded in a bearing* as an element. Ide is directed towards a thrust bearing that includes a carrier and a number of bearing pads supported in the carrier, and fails to make up for the deficiencies of Dunphy, *et al.*, Thomas, *et al.*, and Kersey, *et al.* Therefore, this rejection should be withdrawn.

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CONCLUSION

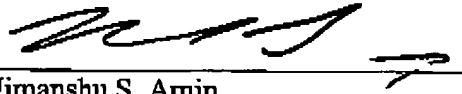
The subject application is believed to be in condition for allowance in view of the above comments. A prompt action to such end is earnestly solicited.

In the event any fees are due in connection with this document, the Commissioner is authorized to charge those fees to Deposit Account No. 50-1063 [ALBRP178US].

Should the Examiner believe a telephone interview would be helpful to expedite favorable prosecution, the Examiner is invited to contact applicant's undersigned representative at the telephone number below.

Respectfully submitted,

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